Temporary Manual 170-181
8/7/61

EXECUTIVE MODEL 10

Citizens Bander Operation Manual

Copyright 1961 by International Crystal Mfg. Co., Inc., Oklahoma City, Oklahoma. Printed in United States of America.

Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein.

INTERNATIONAL CRYSTAL MFG. CO., INC.

18 N. Lee Oklahoma City, Oklahoma

SECTION I

GENERAL

The INTERNATIONAL EXECUTIVE, Model 10, is a compact Citizens Band transceiver which combines a sensitive superhetrodyne receiver with the highly stable and efficient, crystal controlled transmitter made famous by International's "Executive" line of transceivers.

The transmitter oscillator uses fundamental crystals, operating at one-half the desired operating frequency. The crystals supplied have a frequency tolerance of $\pm$ .005% when used in the Executive. A three position crystal switch assembly allows the operator to choose any one of three channels.

Designed to occupy the minimum in "knee room" for under-the-dash mounting, the Model 10 is housed in an attractive, gray colored cabinet. Power supply and speaker assemblies are separate units which may be mounted in any convenient out-of-the-way location. The Model 10 Executive is supplied with microphone and external speaker but less power supply.

The user may purchase the power supply to suit his requirements. Three separate power supplies are available. When combined with the 115 VAC power supply, it may be used in the home or office with power secured from the AC line. For DC operation, with the proper power supply, it may be used in a car, boat, plane or other portable applications wherever there is 7 or 14 volts DC available. It may be used with a base-loaded whip antenna, regular $\frac{1}{4}$ wave whip, long-wire, ground plane, beam and other types of antennas.

Though the unit is very versatile, it is not to be expected that either receiving or transmitting results will be the same in every installation. As in all radio communications and particularly in VHF applications, the type of antenna, its location above ground, the noise present in the area and other factors are bound to affect the results obtained.

SPECIFICATIONS

Receiver:

Tuning Range (Manual tuning)	26.955 to 27.255 mc, (Class "D" Citizens Band, Channels 1 through 23).
Sensitivity	Usable to .5 microvolts
Selectivity	20 db down at 10 kc better than 40 db down at 20 kc
Image Rejection	Better than 50 db down
Audio Output	2.5 watts into 4-6 ohms
External Speaker Impedance	4-6 ohms
Noise Limiter	Automatic, series-gate

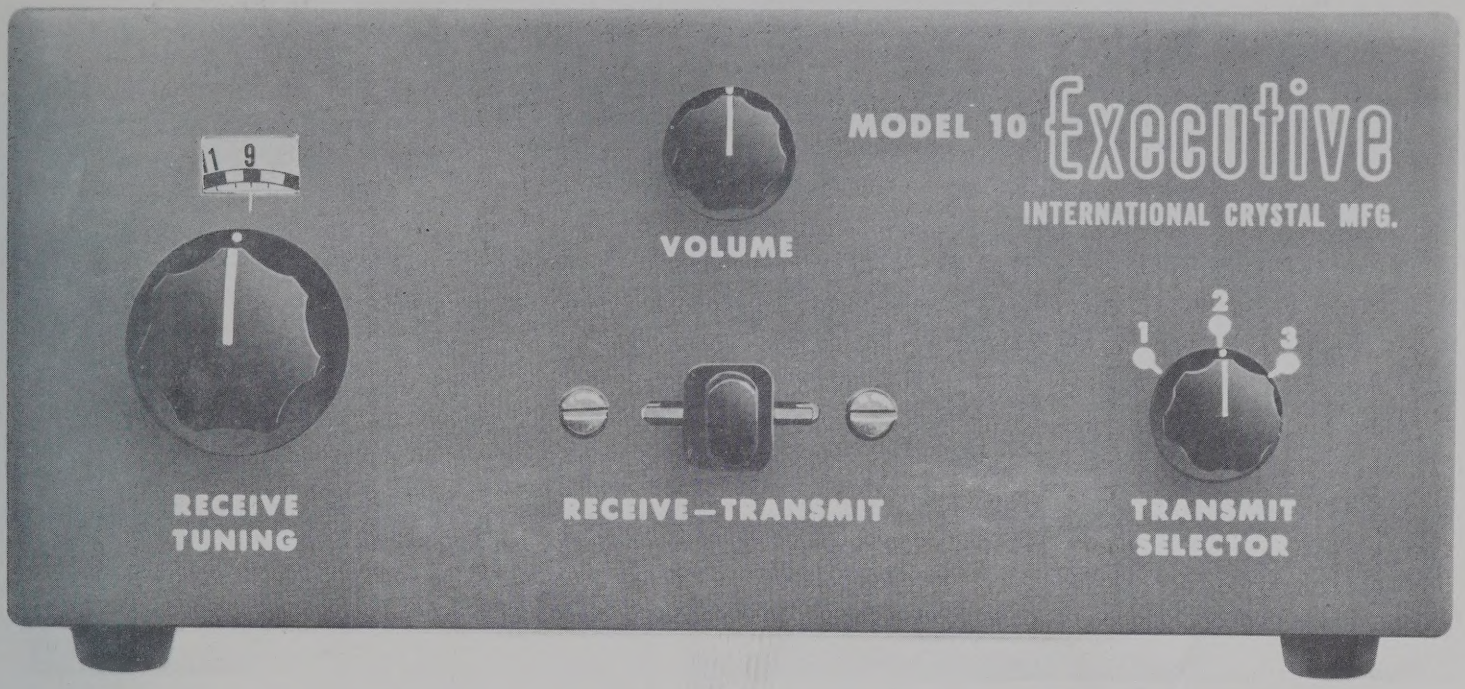
Transmitter

Frequency Stability	± .005% @ 0° to 125° F, when used with INTERNATIONAL high stability fundamental crystals.
RF Power Input	5 watts maximum (FCC rules)
Modulation	Capability - 100%
Crystals Required	Transmitter - International "T" (T-9 for Channel 9, etc.) high stability, fundamental type, at one-half the desired frequency.
Microphone	High impedance crystal or ceramic.

Maximum Power Consumption

Transmitting	50 watts (approximately)
Receiving	45 watts (approximately)

Weight with microphone, less power supply. 4½ pounds (approximately)



FRONT PANEL CONTROLS

VOLUME

On-off switch, volume control. To turn the receiver on, place the TRANSMIT-RECEIVE switch in the **RECEIVE** position as shown above; next turn the **VOLUME** control knob clockwise until a click is heard. Further rotation of this control in a clockwise direction will increase the volume level.

Allow the set to warm up for about one minute before you wish to use it.

RECEIVE TUNING

This control tunes the receiver through the range of all 23 Citizen Band channels. The approximate location of the odd number channels 1, 3, 5 etc., are indicated on the tuning dial. Even number channels fall in between these points.

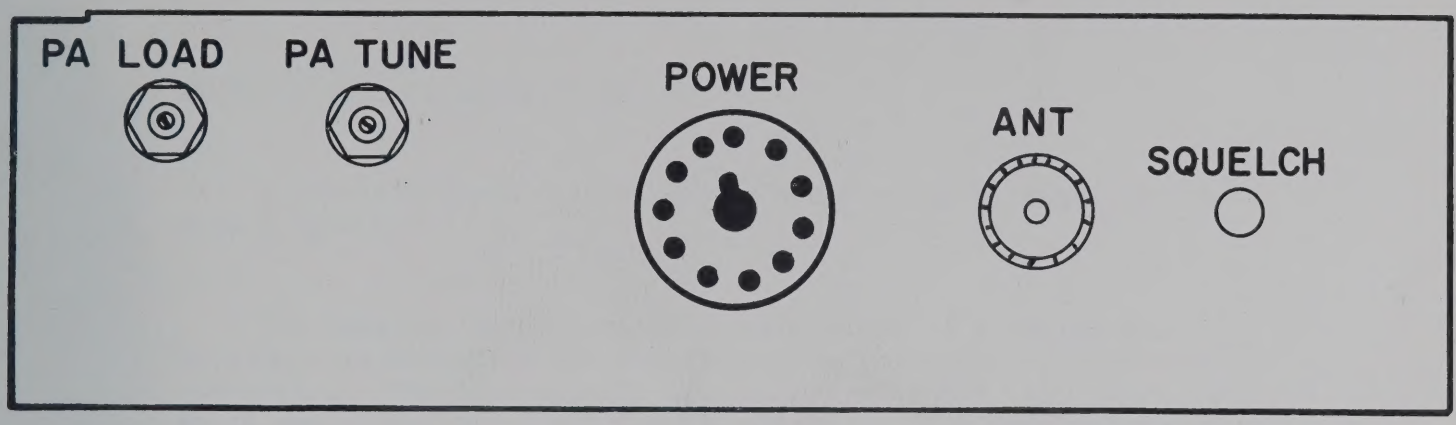
TRANSMIT SELECTOR

A channel 9 crystal has been installed in switch position #2. Place the switch in this position unless you have other crystals installed, in which case select the channel on which you desire to transmit.

TRANSMIT-RECEIVE

No front panel controls are provided for adjustment of the transmitter. Changing from Transmit to Receive is accomplished by the **TRANSMIT - RECEIVE** Switch.

The transmitter is energized when the Transmit-Receive switch is placed in the TRANSMIT position. This switch changes all necessary power and antenna connections.



REAR PANEL CONTROLS

PA LOADING

This control is mounted on the rear panel. Its function is to match the output of the power amplifier plate circuit to the transmission line.

Adjustment of this control must be made only by a technician properly licensed by the F.C.C.

PA TUNING

This control is also mounted on the rear panel. Its function is to tune the power amplifier plate circuit to resonance on the channel being used.

Adjustment of this control must be made only by a technician properly licensed by the F.C.C.

POWER

An 11-contact keyed plug is used as a power connector. This allows various voltages to be used without requiring changes within the unit.

All necessary connection changes are made on the external plug and within the various power supply units.

ANT (Antenna Receptacle)

This receptacle is used to connect the antenna transmission line to the **TRANSMIT-RECEIVE** switch. The receptacle is a standard low-loss, VHF type designed for 50 to 72-ohm coaxial cable.

SQUELCH

This hole is provided for mounting the squelch control. The accessory is not furnished with the unit and may be purchased in kit form.

SECTION II

RECEIVER CIRCUIT DESCRIPTION

A complete block diagram of the transceiver is shown on page 7 herein.

The receiver section of this transceiver is a single conversion unit employing the superhetrodyne principle of frequency conversion. The "front end," is composed of three basic sections; an rf amplifier, mixer and tunable oscillator. A received signal from the antenna is coupled to the control grid of the rf amplifier through a double tuned circuit consisting of coils L1 and L2, their respective shunting capacitors, and coupling capacitor C3. This double tuned circuit aids greatly in the elimination of unwanted signals outside the passband to which it has been tuned. The gain of the rf amplifier is controlled automatically by the receiver's AVC system coupled to the control grid of V1 through a 1 megohm resistor.

After reaching the control grid of V1(6BA6), the signal is amplified and coupled to the control grid of the mixer, V2A (triode section of 6CL8A). Here the signal is hetrodyned with a signal in the 26-27 mc region coupled from the oscillator, V2B(tetrode section of 6CL8A). A difference frequency signal of 455 KC is selected in the plate circuit of V2B and transformer coupled to the control grid of the intermediate frequency amplifier V3(6BA6). The signal is further amplified in V3 and coupled from the plate through transformer, T2 to the plate of the detector, V4A, where the audio component is detected. V4A is also used to produce the AVC voltage. The detected signal is coupled to V4B which acts as a series-type noise limiter removing noise pulses which may ride through on the signal.

The third section of the receiver is a conventional audio amplifier consisting of a twin triode audio voltage amplifier, (12AX7) V5A-V5B followed by a 6AQ5 (V6) tetrode power amplifier. When the transceiver is in RECEIVE position only one half of the 12AX7 is used. The second triode section V5B receives the audio signal from the center tap of the volume control. The audio signal is amplified in V5B whose output is RC coupled to the control grid of the power amplifier, V6. The audio signal is further amplified in V6. The plate of V6 is connected to transformer, T-3, which performs a dual function. In RECEIVE position this transformer acts as a normal output transformer with its secondary connected to the external speaker. In TRANSMIT position, its function is that of a modulation transformer.

TRANSMITTER CIRCUIT DESCRIPTION

The transmitter is a two-stage unit consisting of a crystal controlled oscillator and neutralized tetrode final amplifier. The crystal oscillator is an electron-coupled Colpitts circuit with the crystal oscillating in the grid-cathode circuit. The oscillator uses International high stability, fundamental type crystals operating at one-half the desired transmitter output frequency. A three position switch, TRANSMIT SELECTOR, is provided to select any one of three crystals, which may be installed within the unit. A channel 9 crystal is furnished with the unit and installed in position #2 of the Transmit Selector crystal sockets.

The plate circuit of the oscillator is tuned to the second harmonic of the crystal frequency by coil L7. The oscillator output is coupled to the grid of final amplifier, V8, through capacitor C48. The plate circuit of V8 is a shunt-fed, pi matching network. Neutralization is accomplished by capacitor C45, and link coil L8, coupled to the cold end of coil L7.

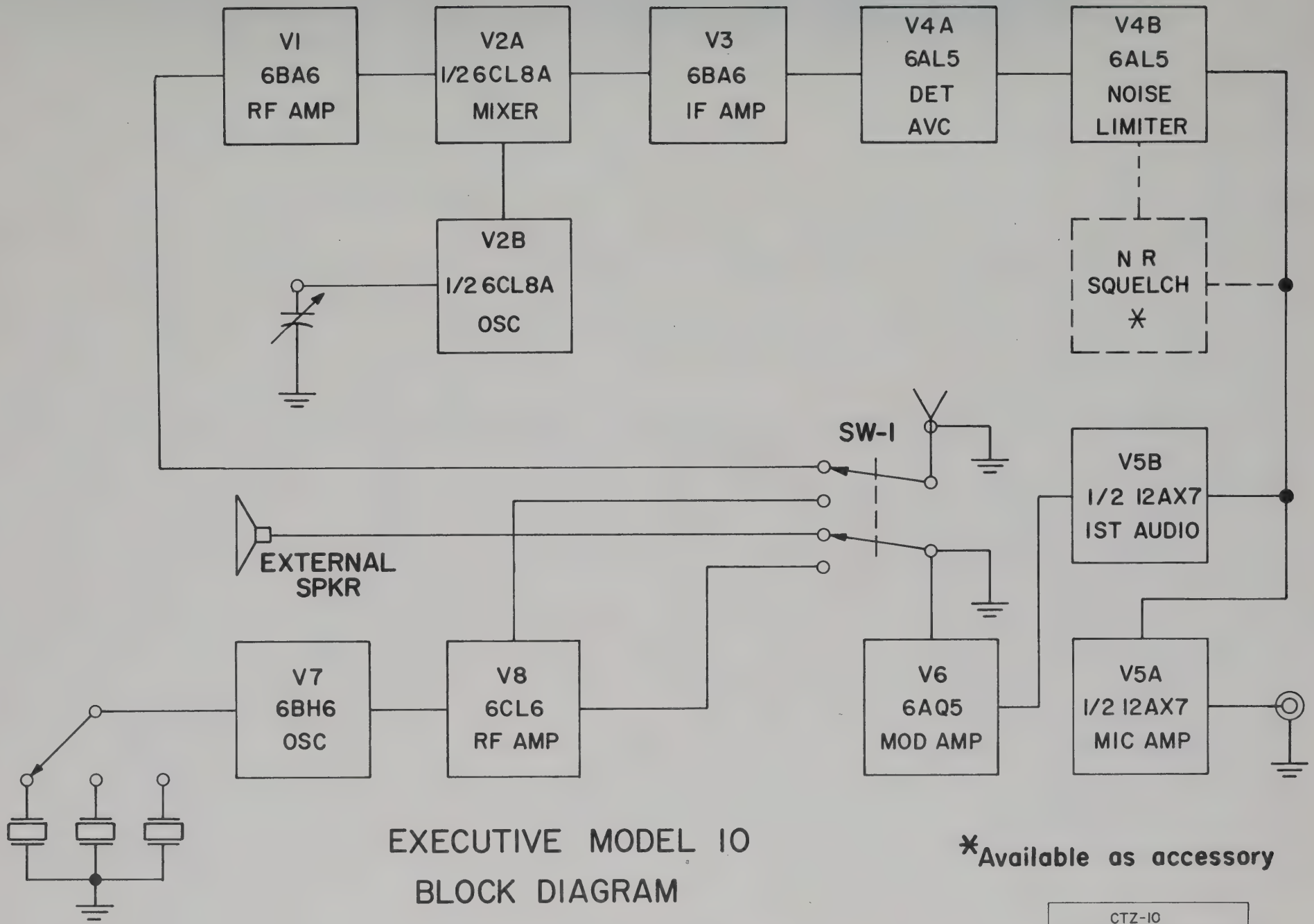
NOTE: Capacitor C40, which is a small compression mica capacitor should not be adjusted, except by a technician with a commercial F.C.C. license, as this adjustment can effect the frequency of the transmitter.

POWER SUPPLY DESCRIPTION

Power for the Executive Model 10 is supplied from an external unit (not supplied). Available as accessories for this transceiver are three separate power supplies, one each for 115 VAC, 7VDC (6V battery system) and 14 VDC (12V battery system). You will note that the DC supplies input voltage is either 7 or 14 volts DC. These supplies are designed around the normal voltage levels experienced in automotive electrical systems with the system operating from the generator output rather than the voltage level of the battery alone.

Each supply operates as a conventional, full-wave rectifier followed by a capacitor input RC filter network. On 7 and 14 volts DC operation, a vibrator circuit is used to provide the necessary AC voltage for the primary circuit of the power transformer.

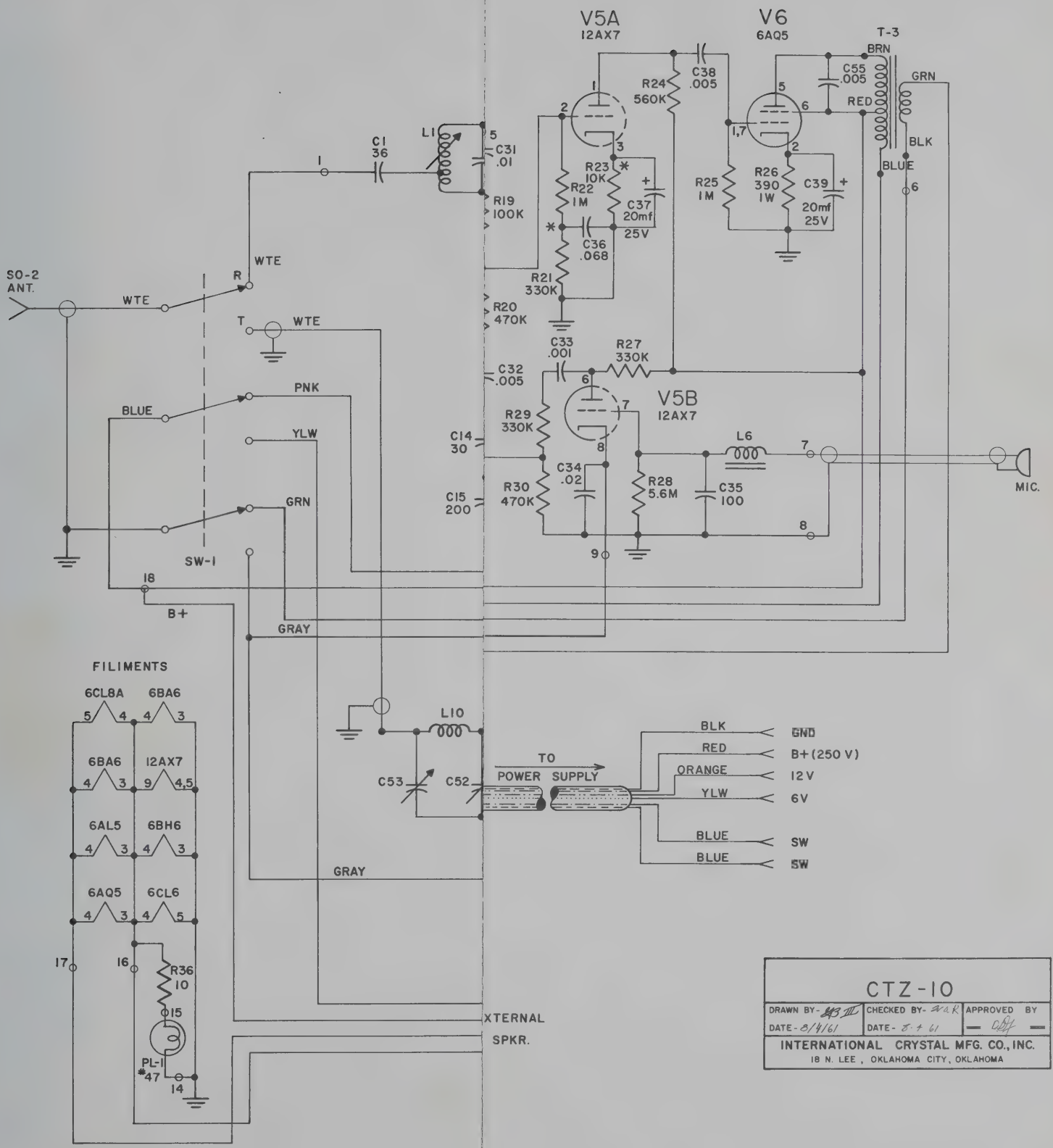
Each power supply is fused to safely handle the normal power load presented by the transceiver.



EXECUTIVE MODEL 10
BLOCK DIAGRAM

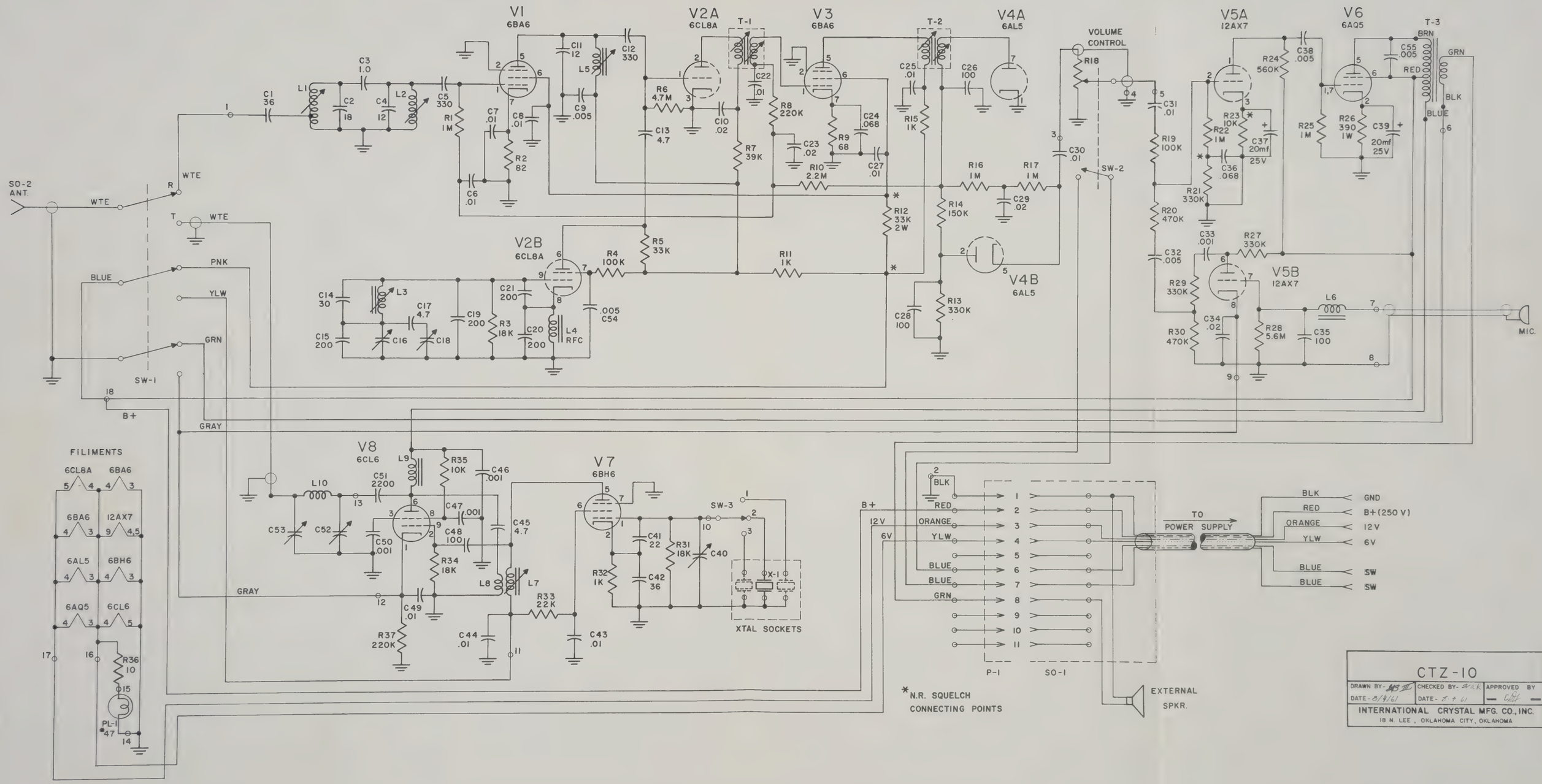
*Available as accessory

CTZ-10		
DRAWN BY: [illegible] DATE: 8-7-61	CHECKED BY: [illegible] DATE: 8-7-61	APPROVED BY - -
INTERNATIONAL CRYSTAL MFG CO., INC OKLAHOMA CITY, OKLAHOMA		



CTZ-10		
DRAWN BY- [illegible]	CHECKED BY- [illegible]	APPROVED BY
DATE- 8/4/61	DATE- 8-7-61	[illegible]

INTERNATIONAL CRYSTAL MFG. CO., INC.
18 N. LEE, OKLAHOMA CITY, OKLAHOMA



CTZ-10		
DRAWN BY- [illegible] DATE- 8/4/61	CHECKED BY- [illegible] DATE- 8-4-61	APPROVED BY — [illegible] —

INTERNATIONAL CRYSTAL MFG. CO., INC.
18 N. LEE, OKLAHOMA CITY, OKLAHOMA

GENERAL

The International Executive Model 10 comes equipped with a microphone, power cable and speaker assembly. Carefully unpack the shipping carton and check the contents against the packing list.

The power cable, designed for connection to the International PW-3 series power supplies, consists of several colored wires with a female push-on connector fastened to the free end of each wire. These push-on connectors are designed to attach to mating terminal strip connectors in the power supply and speaker assembly units.

You will note that there are two wires, one green and one black, which are longer than the other cable wires. Attach the long black wire to either connector on the terminal strip mounted in the speaker assembly case; attach the long green wire to the remaining connector on this terminal strip.

The remaining wires are attached to mating terminal strip connectors in the power supply . Slip the power cable rubber grommet in the slot on the bottom edge of the power supply chassis and attach each wire to the terminal strip connector identified with the cable wire color, i.e., black to blk, red to red, etc.

If a power unit other than the PW-3 is used with the Executive Model 10, the user should refer to the table below and the schematic diagram on page 8 of this manual for proper power connections.

Black	-	Ground
Red	-	B+ 250 vdc @ 90 ma
Orange	-	14 volts (Gnd. when using 7 volts for fil. supply)
Yellow	-	7 volts (Not used when using 14 volts for fil.supply)
Blue	-	Switch
Blue	-	Switch

FIXED LOCATION INSTALLATION

Operation of the EXECUTIVE from any fixed location such as the home or office will always be best with an outside antenna. A full discussion of antenna selection is given at the end of this section.

MOBILE INSTALLATION

It is possible that the EXECUTIVE, when used in a car or other mobile application, may use a short, base loaded whip, mounted on the rear of the unit. It will not however, prove to be very satisfactory. For best results, a whip, mounted outside the vehicle is required. It may be mounted with a bumper mount on the rear bumper, or may be mounted on a rear fender or cowl, using a ball mount.

The EXECUTIVE itself should be mounted under the dash or in some other practical place in the vehicle. A special mobile mount, designed for the EXECUTIVE Model 10, is available from INTERNATIONAL, which allows the unit to be securely mounted to the car, yet be very easily and quickly removed. Information on this mount is given in the ACCESSORIES section of this manual. Various types of antenna mounts and microphones are also available from INTERNATIONAL.

The power supply may be mounted on the fire wall or any convenient out of the way location that will allow a short direct run of the DC power leads to the vehicle battery or hot side of the starter solenoid.

Installations in cars, planes, boats or other locations near gasoline engines present special problems of their own due to noise created by spark plugs, distributor, voltage regulator and generator. A typical mobile installation is shown on page 15. Measures which help reduce this noise are discussed at the end of this section.

VIBRATOR CARE IS IMPORTANT

With proper care, the vibrator used in the transceiver power supply for operation of the unit from 6 to 12 volts dc electrical systems can be extended considerably.

When making a mobile installation the automobile voltage regulator must be adjusted for a maximum generator charging rate of 7.3 volts on 6 volt systems and 14.7 volts on 12 volt systems. Equipment installed in vehicles having the regulator out of adjustment where the generator charging voltage exceeds 7.5 vdc on 6 volt systems or 15 vdc on 12 volt systems shall be considered out-of-warranty.

Excessive voltage causes vibrator contact arcing and eventually the contacts will fuse together. When this happens the fuse blows. The replacement of the fuse and vibrator will only be a temporary cure as eventually the same thing will occur again.

Voltage should be checked at the unit with the engine at fast idle. If it seems as though the battery is fully charged the lights should be turned on for several minutes without the engine running and immediately upon starting the engine the voltage should be noted. If it is excessive the voltage regulator should be adjusted before the equipment is permanently installed. In all cases the voltage must be checked when the generator is charging at maximum.

Vibrators have a thirty (30) day warranty, but if you check the voltage properly you will receive many months of trouble-free operation before needing vibrator replacements.

Also of interest is the fact that vibrator contacts will "stick" under a low voltage condition and all users should be advised that under no circumstances should the vehicle be started when the unit is on. Since a tremendous amount of current is drawn from the battery, voltage in some cases will drop to 50% of its normal value during the starting period which is sufficient time for vibrator failure to occur.

INTERNATIONAL will have available soon a test adaptor for use in making these voltage checks and suggest you watch for the announcement. In the meantime use your regular VOM or VTVM for this test. REMEMBER .... check the voltage AT THE EQUIPMENT since poor connections or long cable leads will be the cause of a low voltage condition.

ANTENNAE AND THEIR SELECTION

By R. R. FREELAND, International Crystal Mfg. Co. 10W0382/10W0326

The most common antennae for citizen use are the Ground Plane and Coaxial for base use and the Vertical Whip for mobile use. The Yagi multi-element beam antenna can be used to great advantage where point-to-point communication is required rather than non-directional coverage from the base station. Any antenna with a directional gain will effectively increase the radiated power of the transmitter as well as the received signal applied to the receiver.

It is best to purchase a good commercially built antenna rather than attempt to construct your own. Good commercial antennae have low SWR (standing wave ratio) which is a merit of the radiation efficiency. With home constructed antennae it is sometimes difficult to effect a good match between the antenna and the transmitter causing considerable power to be lost in the system. An antenna should have an SWR of no more than 2:1.

Some power will be lost in the transmission line and therefore long runs should use the larger RG-8U cable. This cable has a lower loss per foot than the smaller RG-58/U. Both types have a characteristic impedance of 53 ohms. Loss per 100 feet at 27 megacycles is 1 db for RG-8/U and 2 db for RG-58/U. For short runs the RG-58/U cable is more easily handled.

Most of the antennae are available in two grades. The lower priced standard grade will not be as mechanically strong as the commercial grade. Electrically both grades are usually about equal. Where ice loads, wind, and salt air are a factor it will be cheaper in the long run to purchase the better antenna.

For extremely short range communication (less than a mile) the base loaded case whip antenna works very well. With two units using case whips, the signals will become quite weak after a block or two and poor squelch operation will be encountered. The outside antenna is by far the best choice and should be mounted as high as practical and still be within F.C.C. regulations. [Paragraph 19.25(c)]. In brief, the F.C.C. limits antenna height to no more than 20 feet above an existing structure or not to extend above the top of the radiating element on an existing tower. Remember the Yagi type antenna is usually mounted in a horizontal position. This type antenna must be used with another antenna mounted in the same plane. If the Yagi is to be used to communicate with mobile units using a whip antenna, the Yagi should be mounted in a vertical plane. A little thought in antenna installation will greatly improve your coverage.

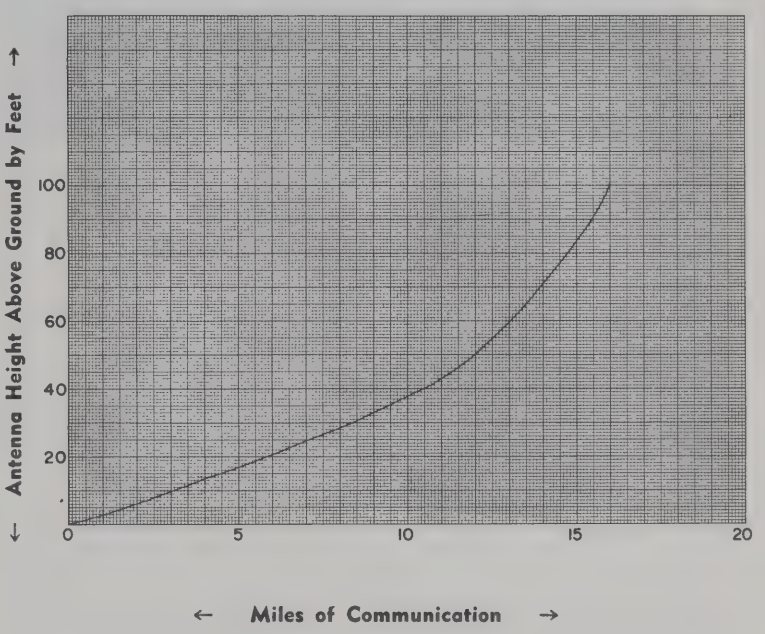
DISTANCE vs ANTENNA

The direct coverage you are able to obtain using Citizen Equipment in the 27 megacycle band will depend a great deal upon the antenna. We shall speak of direct coverage rather than skywave coverage wherein you may communicate 500 to 2000 miles at various times.

The F.C.C. has intended the Citizen use to be for short range communication and all installations should be calculated on this basis. The following charts consider a base station antenna mounted on a mast with the calculated range to a mobile unit using a standard 108" whip. Remember that the antenna may be mounted on an existing structure or mast [reference F.C.C. 19.24(c)].

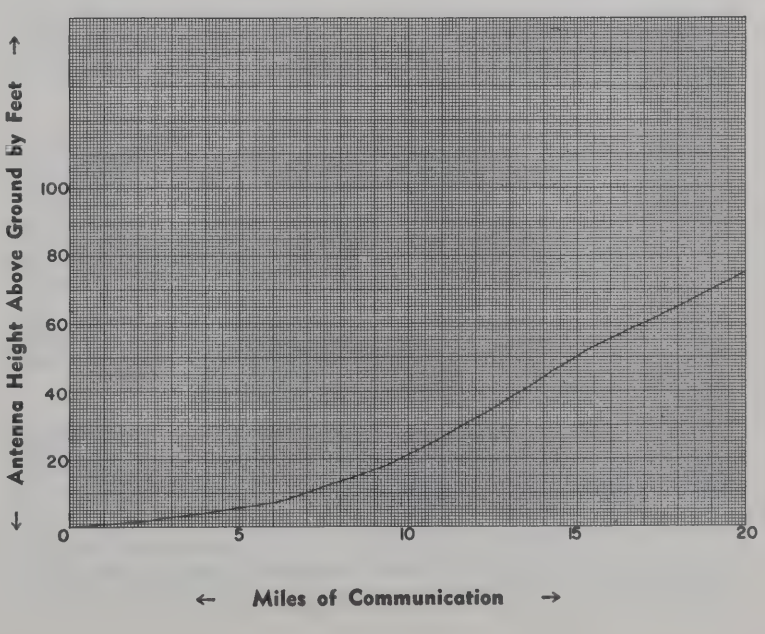
Ground Plane or Coax Antenna For 2 Microvolts at Receiver

Chart #1



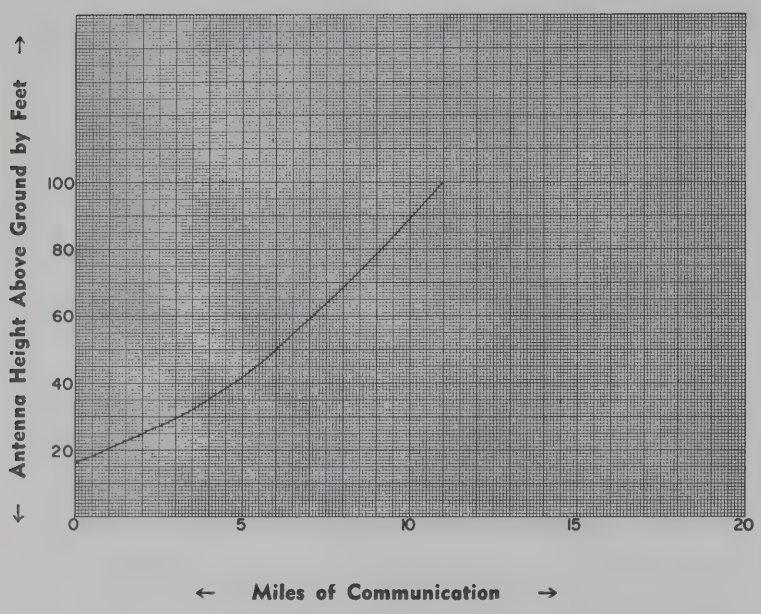
Yagi Antenna Mounted Vertical For 2 Microvolts at Receiver

Chart #2



Ground Plane or Coax Antenna For 15 Microvolts at Receiver

Chart #3



Note how the distance increases with increase height of the antenna for a given installation as in Chart 1. If a direction antenna is used as in Chart 2 you can see how the distance is further increased, however, this reduces the area covered since the Yagi Antenna is quite directional.

Charts 1 and 2 are based on a 2 microvolt signal at the receiver. This signal will not be sufficient for many city areas where high levels of noise exist. Chart 3 considers the coverage for 15 microvolts at the receiver and is more practical for general city use.

When the Citizen frequencies are open to skywave transmission, signals from distant stations will be strong enough to over power weak direct signals. When one is considering communication he should understand that for 100% contact he should base the calculations on 15 microvolts or more.

In mobile communication dead spots will be found at various points as well as locations giving excellent signals. These points should be noted and contacts made from the best possible locations. Vehicle noise and electrical interference will greatly reduce your communicating distance.

ELIMINATE YOUR MOBILE "NOISE GENERATORS"

By GEORGE L. BEYERS, 10W0376

Now that low cost TWO-WAY radio communication is available to everyone with the opening of the eleven meter band for Citizen use the number of mobile installations will probably exceed the number of base, or control, stations by a factor of 5 to 1 within the near future. It is estimated there are now over 160,000 citizen band mobile installations and approximately 45,000 base, or control, stations in operation. Proper installation and necessary steps towards the elimination of electrical, and mechanical, interference inherent in all motor vehicles is of prime importance if distances of three miles or more are desired to be covered.

For short range coverage the simple installation of a "radio condenser" on the generator and the "interference suppressor" installed in the top of the distributor, or coil, is usually sufficient noise suppression. But when maximum distances of three or more miles must be covered, great pains must be taken and all known means of noise suppression must be used. Different makes and models of vehicles will require different means of noise suppression. Some models only the very simple, others will need the "all out" method.

As there are numerous "generators" of radio interference in every motor vehicle the elimination of one source may not be noticeable as it's noise level may be below one you have not located so the proper way to approach your "noise" problem is by a systematic process of first suppressing all known offenders, namely the generator, voltage regulator, distributor and spark plugs.

We will explain throughout this article what is considered to be the proper vehicle noise suppression methods. The volume of noise you can, or will, tolerate in your receiver will depend upon the amount of suppression applied. Few installations will require the "all out" method and the user must decide when he is satisfied.

The purpose for eliminating your own "noise generators" is the fact that your receiver's automatic volume control (AVC) will react to these random noise pulses the same as though a strong station was tuned-in and will cut the receiver's sensitivity way down which will eliminate the weak stations you normally wish to copy. There's an old saying "if you can't hear them, you can't work them."

Let's start our "noise elimination" with the generator and voltage regulator. The generator is the item that causes the whine as the speed of the motor is increased. It is very easily detected by speeding up the engine and then cutting the ignition off. The instant the switch is turned off ONLY the generator and voltage regulator can cause the noise as all other "noise generators" are eliminated when the switch is off EXCEPT the generator as it is still in operation and is still trying to charge the battery through the voltage regulator. Even though it will operate only a few seconds after the switch is off this is time enough for you to hear the terrific amount of noise it is generating. As the speed of the engine decreases the whine will decrease in unison.

Practically all vehicle manufacturers cable the two leads from the voltage regulator to the generator in a harness with other wires. It is recommended that both of these wires be run in **separate** tinned copper braid. Just disconnect the present wires from the generator and the other end of them at the voltage regulator's "A" and "F" terminals. They can be cut-off where they enter the harness or just taped down out of the way.

A Sprague 48P18 coaxial capacitor, or a similar .5 mfd coaxial capacitor, should be installed directly ON the generator and the lead from the condenser to the battery armature terminal of the generator must be as short as possible. In fact a length of one inch is sometimes too long. A .001 mfd mica capacitor should now be installed from the same battery terminal to the frame of the generator, here again lead length is extremely important and they should be no longer than one-quarter inch. Be sure to remove paint and grease on the generator where the capacitor is bolted as a "good" ground at this point is necessary.

Dress the cable from the coaxial capacitor on the generator against the body of the car. Use speed clips to keep in place or run through presently installed cable clamps. This cable is usually the longest "noise generator" we must suppress and it is preferred to shield this wire in tinned copper braid. The end of the braid must be soldered directly to the coaxial capacitor's body. Be sure to use size #12 copper stranded wire when making-up this new lead. Connect a new cable to the generators' "F" (field) terminal and run this lead in a tinned copper braid shield and dress it along side the battery lead. This new lead may be of size #16 copper stranded wire.

The voltage regulator is next and the "job" from here on is usually easy compared to the one just completed. Remove the cover from the voltage regulator and clean off any paint that may insulate the cover from the frame. Check the mounting screws and be sure the regulator is being grounded directly to the firewall. If necessary remove and clean away any paint so you may secure a "perfect" ground connection.

Use two 48P3 of 48P5 Sprague coaxial capacitors or similar .1 to .5 mfd coaxial capacitors and install at the "A" and "B" terminals of the regulator. The capacitors metal body must be grounded directly to the firewall. This can be easily accomplished by using a piece of cadimun plated metal about 4" x 4" bent to a 90° angle. Drill two holes for the capacitors and two holes to pass sheet metal screws to bolt to the firewall. Attach the capacitors to the angle with screws and nuts and **also** solder. Locate the assembly so the lead from each capacitor to the "A" and "B" regulator terminals are extremely short. Be sure to clean the paint from the firewall so the bracket will make a good solid ground connection. Attach the cable from the generator's "F" terminal to the voltage regulator's "F" terminal. Connect a .002 mfd capacitor and a 4 ohm resistor, in series, from this point to ground. Again, lead length is important and the overall length of the capacitor-resistor combination must be as short as possible. Attach the lead from the generator's armature terminal to the coaxial capacitor connected to the voltage regulator's "A" terminal. The shielding braid on these leads must be grounded to the capacitor bracket or to the firewall by soldering or with the use of washers and sheet metal screws. Attach the "B" battery lead to the coaxial capacitor connected to the "B" terminal of the voltage regulator. This is the lead coming through the firewall and usually goes direct to the battery charging indicator on the vehicles dash panel.

The next superb "noise generators" of them all are the spark plugs. But here we have available to us years of research for only a few dollars. Just go to your local auto supply store and purchase a complete set of AUTO-LITE RESISTOR spark plugs that are direct replacements for your particular brand and model of vehicle. CAUTION: We own no stock in Auto-Lite, but please accept no "substitute" as some **resistor** plugs will actually increase your noise problem. Be patient, if your dealer does not stock your size just ask him to get them for you. When installing the new plugs be sure to have the gap properly set.

After **properly** installing the "recommended" suppression to these trouble makers you should be able to drive comfortably and communicate with stations you never heard before with your engine running. However, in most cases this is only the beginning of the job in order for you to say that you have a good mobile installation.

If you have been checking your "noise elimination" progress as you complete each step we know you will be extremely pleased with your work. But from here on each suppression job will not be very noticeable until you hit the one big joker that's causing a lot of trouble. The little "noise generators" will be obscured by this one and wouldn't have showed up until it was eliminated. All-in-all the little ones can really add up and must be taken care of in due time.

Have your distributor checked to see that the capacitor across the breaker points has the proper capacitance and the points are properly set. If the vehicle has been driven 30,000 to 40,000 miles or more it is recommended that the distributor cap and rotor be replaced. This will usually not only reduce the ignition noise, but also improve the overall performance of the engine. At the same time have the timing checked and properly adjusted.

When purchasing your new AUTO-LITE resistor spark plugs also buy enough 4,000 ohm-per-foot ignition cable to make up a new wiring harness from the distributor to the spark plugs. Be sure that the new terminals (ferrules) are installed whereby they make **good** contact with the center conductor of the new cable. It is preferred that the ferrules be soldered rather than crimped on as there is danger of a poor contact causing another "noise generator" to appear.

Check your ignition wiring by shorting out each plug, in turn, while listening to the receiver. Any reduction in the noise level will usually indicate that the ferrules are not making good contact in the distributor head, or the ferrule and center conductor should be soldered.

Install a 10,000 ohm carbon suppressor in the distributor's center terminal and make up a new lead to run to the coil. Here again be sure the ferrules are soldered and are making a "tight" connection inside the coil and distributor. A new lead is recommended here as any breaks what-so-ever in the ignition system's wiring insulation could be a source of "ignition noise." With very short leads connect a .001 mfd disc ceramic capacitor from the coil's battery terminal to the coil's case.

Bonding braid should now be run from the fire wall, coil, and the distributor to the engine. Use as short a piece of braid as possible in each case. If the ground lead of the battery is attached to the fire wall it should be removed and attached to the starter mounting bolt. The power cable ground lead for your transceiver should also be connected at this same point. Usually the hot and ground leads from the battery go direct to the starter's

solenoid which is mounted on the starter and this is a good place to connect the transceiver's power cable. CAUTION: Remove the hot cable from the battery before making connections to the starter as there is danger of the hot battery cable getting loose and shorting out the battery or even starting a fire.

Connect a short piece of bonding braid across each engine hood hinge. NOTE: The hood will act as a shield to help keep the engine noise inside the engine compartment and away from your antenna. Next connect a short length of bonding braid across each trunk lid hinge, front of the engine to the frame, exhaust tail pipes to the frame, and a piece of wire braid from the air cleaner to the fire wall. It is very important that we caution you to be sure that you clean away all paint, grease or insulation material when installing the grounding braid as **good,** low resistance, ground connections must be made.

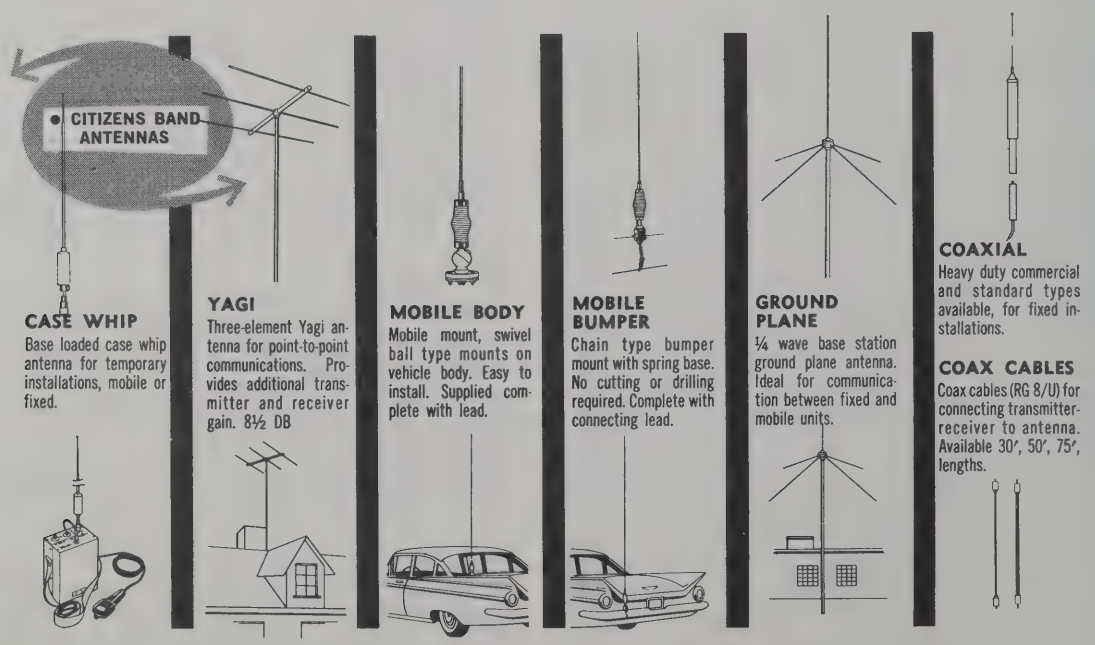
Noisy tires should be treated with an anti-static powder, brake shoes grounded to the backup plates with bonding braid and static collectors installed inside the front wheel grease retainer cups. Heat and oil indicator sending units on the engine must be by-passed with .1 to .5 mfd capacitors, again using very short leads. All instrument panel gauges and accessories should be by-passed using .5 mfd capacitors. Heater and defroster motors, electric windshield wiper motors and any other accessory motors by-passed with a .25 to .5 mfd capacitor. The gasoline sending unit mounted on the gasoline tank must be by-passed with a .1 to .5 mfd capacitor. An inspection plate is usually provided in the trunk compartment over the tank.

For the person who desires the "ultimate" in mobile "noise elimination" there are available for some vehicles marine and aviation spark plugs that could be used and the complete ignition system shielded by using these plugs and making metal boxes to enclose the distributor and coil, and shielding all wiring associated with the ignition system. By having the ignition system **completely** shielded most of the "suppression" can be eliminated and the normal high engine performance will be maintained.

You should set aside a week-end for your "noise elimination" project and have all necessary parts and tools available. You may visit your local two-way radio communications company and secure most of the parts required in kits furnished by some manufacturers of two-way radios. The other parts required are available from radio parts supply and auto parts supply firms.

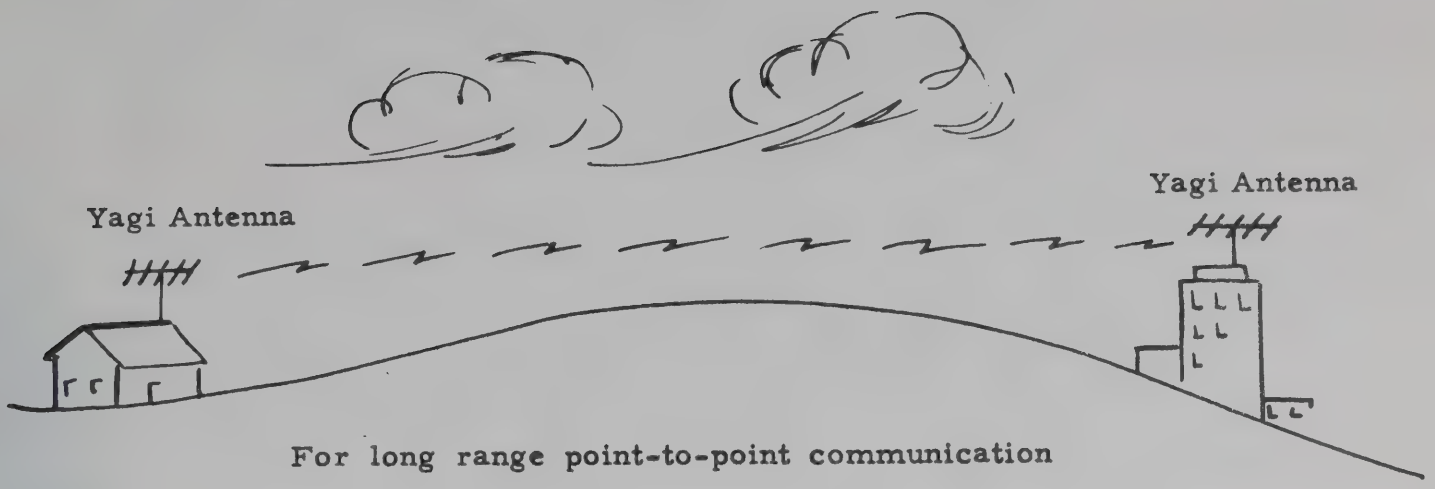
Lay out your line-of-attack and as each "noise generator" is suppressed it should be noted and checked by listening to the receiver or noting the receiver's "S" meter indication before and after the suppression. This indicates the noise level entering the receiver that is being picked-up by the antenna. To check the noise level entering the receiver by the antenna connecting cable disconnect the cable where it connects to the antenna and short the cable's terminals. If noise is still noticeable it will be necessary to re-route the cable under the vehicle and up through the fire wall to the transceiver. Check the noise level entering the receiver through the power cable by disconnecting the antenna connecting cable at the receiver. All noticeable noise in the receiver is now being picked-up by the power cable and fed to the receiver. This can usually be eliminated by installing a Sprague 48P3 feed-thru coaxial capacitor on the fire wall and the hot battery lead from the transceiver connected through the capacitor to the battery terminal.

We sincerely hope that we have been of some help to you and assure you that when you finish your "noise elimination" project you will consider yourself an "**expert.**" But just as a parting reminder, remember that all of those cars along side of you, up front, behind and the ones passing have not been through the "elimination" process and it will be up to your receiver's built-in noise limiter to cut **their** noises down to a listening level that is bearable.

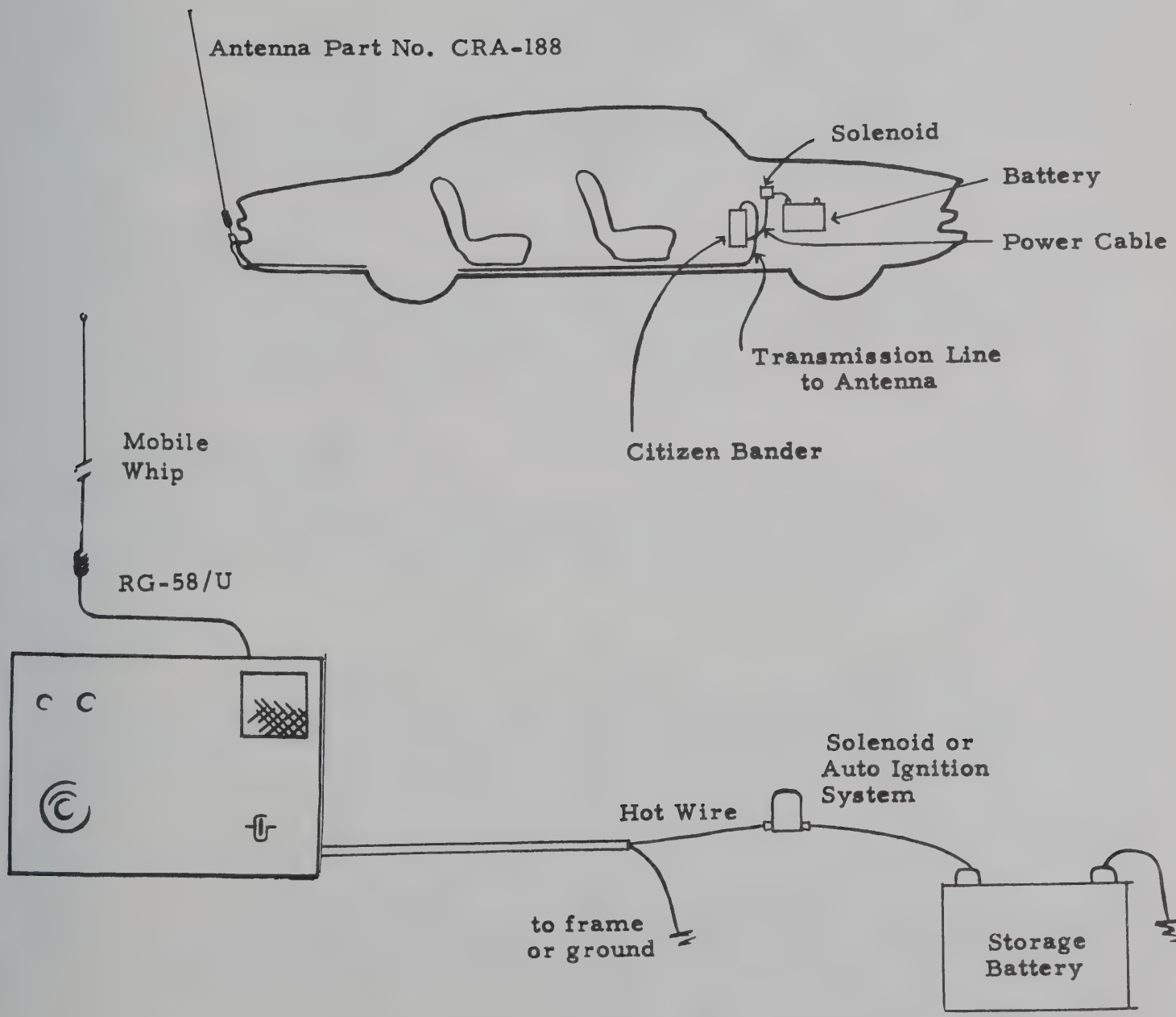

CITIZENS BAND ANTENNAS
CASE WHIP
Base loaded case whip antenna for temporary installations, mobile or fixed.
YAGI
Three-element Yagi antenna for point-to-point communications. Provides additional transmitter and receiver gain. 8½ DB
MOBILE BODY
Mobile mount, swivel ball type mounts on vehicle body. Easy to install. Supplied complete with lead.
MOBILE BUMPER
Chain type bumper mount with spring base. No cutting or drilling required. Complete with connecting lead.
GROUND PLANE
¼ wave base station ground plane antenna. Ideal for communication between fixed and mobile units.
COAXIAL
Heavy duty commercial and standard types available, for fixed installations.
COAX CABLES
Coax cables (RG 8/U) for connecting transmitter-receiver to antenna. Available 30′, 50′, 75′, lengths.

For further information see your local dealer or write International Crystal Mfg. Co.

Reprinted by International Crystal Mfg. Co., Inc.
From Class "D" Citizens Band Radio 1960 Call Book



For long range point-to-point communication



Typical Mobile Installation

SECTION IV

ACCESSORIES

POWER SUPPLY ASSEMBLIES

Designed as compact accessories that will allow mounting at any convenient out of the way location, the three power supply assemblies for the Executive Model 10 may be easily connected to the set power cord leads with snap on type connectors.

115 VAC	Power Supply - Part No. 150-179
7 VDC	Power Supply - Part No. 150-184
14 VDC	Power Supply - Part No. 150-185

P-T-T RELAY KIT

Furnished with complete installation instructions, this accessory adds the many advantages of "push-to-talk" operation to the Executive Model 10. Part No. 150-186

NR- SQUELCH KIT

This famous squelch circuit may now be added to the Executive Model 10. Furnished with all mounting parts and complete installation instructions this accessory adds a squelch circuit only available in higher priced units. Part No. 150-187

MMR-2 MOBILE MOUNT

Available from International is a mobile mount designed with the customer's convenience in mind. This accessory permits the transceiver to be installed with the least amount of effort.

ANTENNAS

Without an efficient antenna, operation of your EXECUTIVE is not as enjoyable as can be experienced with a well designed antenna system. International has available antennas for almost any installation. For details see page 14 & 15.

12 POSITION TRANSMITTER SWITCH

For those who may desire the convenience of more than three transmitting crystals, International now has a crystal switch assembly which accommodates 12 crystals. This unit is easily installed and is nominally priced. Part No. 150-163.

All accessories are available from your International dealer.

WARRANTY

International Crystal Manufacturing Company warrants the parts and tubes in any International Citizen Transceiver to be free from defects in workmanship and material arising from normal usage. Its obligation under this warranty is limited to replacing any such parts or tubes of the receiver which, after regular installation and under normal usage and service, shall be returned within ninety (90) days from the date of original pruchase of the set to the authorized dealer from whom the purchase was made and which shall be found to have been thus defective in accordance with the policies established by International Crystal Manufacturing Company.

The obligation of International Crystal Manufacturing Company is limited to making replacement parts available to the purchaser, and does not include either the making or the furnishing of any labor in connection with the installation of such replacement parts nor does it include responsibility for any transportation expense.

International Crystal Manufacturing Company assumes no liability and shall not be liable in any respect for failure to perform or delay in performing its obligations with respect to the above warranty if such failure or delay results, directly or indirectly, from any preference, priority or allocation order issued by the Government, or because of any other act of the Government, or by war, conditions of war, inadequate transportation facilities, conditions of weather, acts of God, strikes, lockouts, Governmental controls, or Internationls reasonable requirements for manufacturing purposes, or any cause beyond its control or occurring without its fault, whether the same kind or not.

CONDITIONS AND EXCLUSIONS

This warranty is expressly in lieu of all other agreements and warranties, expressed or implied, and International Crystal does not authorize any person to assume for it the obligations contained in this warranty and neither assumes nor authorizes any representative or other person to assume for it any other liability in connection with such International Units or parts or tubes thereof.

The warranty herein extends only to the original consumer purchaser and is not assignable or transferable and shall not apply to any transceiver or parts or tubes thereof which have been repaired or replaced by anyone else other than an authorized International dealer, service contractor or distributor, or which have been subject to alteration, misuse, negligence or accident, or to the parts or tubes of any receiver which have had the serial number or name altered, defaced or removed.

International Crystal Manufacturing Company is under no obligation to extend this warranty to any unit for which an International registration card has not been completed and mailed to the Company within fifteen (15) days after date of purchase.

F.C.C. RULES & REGULATIONS

PART 19.72 POSTING OF STATION LICENSE

(b) The current authorization of each citizens radio station operated as a mobile station or operated at temporary locations may be retained in the permanent records of the station and need not be posted; however, an executed Transmitter Identification Card (FCC Form 452-C, Revised) shall be affixed to each transmitter which is operated as a mobile station or is operated at temporary locations, and to the control equipment of each such transmitter in every case where such transmitter is not in view from the location from which the station is controlled.

(c) The following information shall be entered on each Transmitter Identification Card (FCC Form 452-C, Revised) which is used for transmitter or station identification in accordance with the foregoing:

(1) Name of the station licensee;
(2) Station call sign assigned by the Commission (see 19.62);
(3) Exact location or locations of the permanent station records;
(4) Frequency or frequencies upon which the associated transmitter is adjusted to operate; and
(5) Signature of the licensee.

FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D.C.

87048

April 15, 1960

UNAUTHORIZED PRACTICES IN BUSINESS AND CITIZENS RADIO SERVICES

An increasing number of reports have reached the Commission concerning the practice of some suppliers of Business and Citizens Radio Services equipment to advise their customers that such equipment may be operated by them prior to the issuance of a radio station license by the Comcmission. In some instances, sellers have "assigned" radio station call signs to purchasers in conjunction with the sale of radio apparatus and, in a few such cases, these call signs have been identical with those authorized to be used by the manufacturer or seller of the equipment.

A radio station license is required for the use or operation of a radio station in the Business and Citizens Radio Services by Section 301 of the Communications Act. With the exception of certain low power equipment described in Part 15 of the Commission's Rules, the operation of any radio transmission apparatus by a person other than the one to whom the Commission has issued a radio station license is illegal and may result in the imposition of severe criminal sanctions (one year in prison or $10,000 fine, or both) or in the institution of other enforcement action by the Commission.

Under Section 310 (b) of the Communications Act, the prior consent of the Commission is required for the transfer or assignment of any radio station license or the rights granted thereunder. One who fails to observe this provision by the purported transfer of his operating authority subjects himself to possible license revocation and such other enforcement action as the Commission may consider warranted by the circumstances. The denomination of such unlawful activities as "equipment demonstrations" does not render them less illicit.

This matter is being brought to the attention of manufacturers, distributors and retail vendors of Business and Citizens Radio Service communication equipment in the belief that they share the Commission's conviction that the orderly development of these dynamic special radio services is hampered by the above-described practices and that one who engages in such practices, in addition to the possibility of having drastic enforcement action instituted against him, may be sacrificing for the benefit of an immediate sale the long range good will of a misadvised customer.

It is requested that the foregoing be brought to the attention of the personnel in all organizations concerned in any way with the sale, maintenance or use of Business or Citizens Radio Stations in order that a prompt cessation of unlicensed operation of radio stations in these services may be brought about.

-FCC-

10-10-50